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Psychological Outcomes and Gender-Related Development in Complete Androgen Insensitivity Syndrome

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We evaluated psychological outcomes and gender development in 22 women with complete androgen insensitivity syndrome (CAIS). Participants were recruited through a medical database ($n = 10$) or through a patient support group ($n = 12$). Controls included 14 males and 33 females, of whom 22 were matched to women with CAIS for age, race, and sex-of-rearing. Outcome measures included quality of life (self-esteem and psychological general well-being), gender-related psychological characteristics (gender identity, sexual orientation, and gender role behavior in childhood and adulthood), marital status, personality traits that show sex differences, and hand preferences. Women recruited through the database versus the support group did not differ systematically, and there were no statistically significant differences between the 22 women with CAIS and the matched controls for any psychological outcome. These findings argue against the need for two X chromosomes or ovaries to determine feminine-typical psychological development in humans and reinforce the important role of the androgen receptor in influencing masculine-typical psychological development. They also suggest that psychological outcomes in women with CAIS are similar to those in other women. However, additional attention to more detailed aspects of psychological well-being in CAIS is needed.

KEY WORDS: intersexuality; gender identity; sexual orientation; androgen; androgen insensitivity syndrome; sex differences; sexual differentiation.

INTRODUCTION

The actions of the two androgens, testosterone and dihydrotestosterone, are mediated by the androgen receptor encoded by the androgen receptor gene (Lubahn et al., 1988). Defects in this gene can result in complete or partial androgen insensitivity, the clinical manifestations of which were first described by Morris (1953). In XY individuals with complete androgen insensitivity syndrome (CAIS), the external genitalia appear to be completely female at birth. However, testicular hormones that do not act through the androgen receptor have caused regression of the Mullerian ducts, and so internal genitalia are lacking.

Because the external genitalia appear female at birth, XY individuals with CAIS are assigned and reared as girls. In addition, they have excellent feminization at puberty, because testosterone is converted to estrogen that promotes development of feminine secondary sexual characteristics (e.g., breast development). Their complete inability to respond to androgen, however, also results in reduced or absent pubic and axillary hair (Money, Ehrhardt, & Masica, 1968). Usually, the condition is detected when menstruation fails to occur and at this time undescended testes are detected and removed. Following removal of the gonads, estrogen treatment is initiated.

There is little information on psychological gender development in CAIS, and even less on long-term well-being and quality of life. Small group observations without healthy controls suggest that individuals with CAIS usually assume a core gender identity and sexual orientation in line with their female sex of rearing (Grino, Griffin, Cushard, & Wilson, 1988; Wisniewski et al., 2002). They also appear to be typically feminine in terms of marriage

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and maternal interests and they report high femininity and low masculinity from childhood to adulthood on global rating scales (Money et al., 1968; Wisniewski et al., 2000). Girls with CAIS also do not appear to suffer from gender identity disorder, although one study found that about 50% met the criteria for general psychopathology, a similar percentage as seen in the same study for children with other intersex diagnoses (Slijper, Drop, Molenaar, & de Muinck Keizer-Schrama, 1998). There is essentially no information on more general aspects of quality of life in patients with CAIS, despite growing concern regarding psychological outcomes in syndromes involving hormone abnormality (e.g., Diamond & Sigmundson, 1997).

One aim of this study was to assess quality of life and psychological well-being in individuals with CAIS. We also gathered additional data on gender development in women with CAIS, both because of its impact on quality of life and to increase understanding of the mechanisms involved in sexual differentiation of human behavior. In addition, unlike prior studies, we included matched, healthy controls, rather than comparing individuals with CAIS to population norms or clinical control groups. This allowed us to determine how women with CAIS compared psychologically to women of similar age and race. In addition, we used data from unaffected male and female participants to verify the existence (or nonexistence) of sex differences on the measures used in the study.

The following specific hypotheses were tested. (1) Women with CAIS experience reduced quality of life or psychological well-being in comparison to control women. (2) Women with CAIS show alterations in characteristics that show sex differences, including core gender identity, sexual orientation, gender role behavior, personality traits, and hand preferences. This hypothesis was not directional, because the presence of a Y chromosome (Arnold, 1996), or confusion related to awareness of this chromosome, might be expected to have some masculinizing or defeminizing effects in women with CAIS, whereas the complete lack of androgenic influence during development (compared to women in general who have some exposure to adrenal androgens prenatally) might be expected to have the opposite (i.e., demasculinizing or feminizing) effects (Collaer & Hines, 1995).

METHOD

Participants

CAIS

Participants with CAIS over the age of 15 years were recruited from two sources, a clinical database of intersex

cases held at the Department of Paediatrics, University of Cambridge, and a support group for individuals with AIS. The database included 32 individuals with CAIS in the appropriate age range. The ethical permission for the study required the approval of the individual's primary medical practitioner before approaching the patient. In 11 of 32 cases, details of this practitioner were not available in the database or from the referring hospital, and in an additional 10 the practitioner was not willing to allow the patient to be approached, in some cases because the practitioner was concerned that the individual did not know her diagnosis or was having trouble adjusting to it. Hence, these 21 individuals could not be contacted about the study. The 11 remaining individuals were contacted and 10 participated. All 10 had a defect in androgen receptor binding or in the gene encoding the androgen receptor (Ahmed et al., 2000). A second group of 12 volunteers with a presumed diagnosis of CAIS was recruited through flyers at an annual meeting of the AIS Support Group in the United Kingdom, and through e-mail advertisement of the study to the Support Group membership. All 22 participants with CAIS were Caucasian and had been raised as females. The mean age of the CAIS individuals was 21.3 ($SD = 8.3$) for those recruited through the database and 32.4 ($SD = 11.8$) for those recruited through the support group.

Controls

Forty-seven individuals without CAIS were recruited specifically for this study either as siblings of affected participants ($n = 3$), acquaintances of the investigators ($n = 9$), or via flyers at the university where the study was conducted ($n = 35$). Twenty-two controls were matched one to one with CAIS participants on the basis of sex-of-rearing, age, and race. The mean age of these 22 matched female controls was 27.7 ($SD = 12.3$).

The total of 47 control participants includes 14 males and 11 females in the same age range as the other participants in addition to the 22 matched controls. This increased the sample of unaffected females and provided a group of unaffected males to evaluate whether the dependent measures used in the study showed the expected sex differences.

Measures and Procedures

Questionnaires were used to assess general psychological well-being and gender-related psychological characteristics. Data were scored and analyzed by researchers blind to the diagnosis of individual participants. The

methodology for the study was approved by the local regional ethics committee, and all data were collected by postal questionnaires that preserved the anonymity of participants.

General Psychological Well-Being

The Self-Esteem Scale (Rosenberg, 1965) and the Psychological General Well-Being Scale (PGWBS; Depuy, 1984) served as measures related to general psychological well-being or quality of life. The Self-Esteem Scale measures self-acceptance and basic feelings of self-worth. It includes 10 items, each of which is scored on a 4-point continuum from *strongly agree* to *strongly disagree*. Scores range from 10 to 40, with lower scores indicating higher self-esteem. The PGWBS is a 22-item measure of general life-satisfaction. Items assess emotional health in six domains: anxiety, depressed mood, positive well-being, self control, general health, and vitality. Participants rate each item on a 6-point scale (from 0 to 5) to indicate how they have been feeling during the last month. Total scores range from 0 to 110.

Gender-Related Psychological Development

Core Gender Identity, Sexual Orientation, and Gender Role Behavior. A 12-item questionnaire (see Appendix A) was used to assess three areas of gender-related psychological functioning: core gender identity (the sense of self as male or female), sexual orientation (preferences for sexual partners of the same or other sex), and gender role behavior (participation in stereotypical masculine and feminine activities). These areas were selected for assessment because they comprise the three major dimensions of psychosexual differentiation (Green, 1974). Within each of the three areas, half of the items inquired about the past 12 months and half about the lifetime. Items 1 and 2 on the questionnaire assessed gender role behavior, Items 3–8 assessed gender identity, and Items 9–12 assessed sexual orientation. Responses to Items 1–8 were made on a Likert scale ranging from 1 (*always*) to 7 (*never*). For Items 9–12, responses were made on a Likert scale ranging from 1 (*exclusively heterosexual*) to 5 (*exclusively homosexual*). For scoring, the numerical responses within each behavioral category were summed, with responses to negatively worded items (Items 5–8) reversed prior to summing. Lower scores indicate more sex-typical gender role behavior, more satisfaction with the sex of assignment, and a more heterosexual orientation.

Childhood Gender Role Behavior. Participants also provided retrospective information on gender role

behavior in childhood, including preferences for stereotypically masculine toys (e.g., vehicles), feminine toys (e.g., dolls), and neutral toys (e.g., board games), stereotypically masculine activities (e.g., rough, active play), preferences for male versus female playmates, and global ratings of the degree to which their childhood behavior was “girlish” and “boyish.” A composite variable, “childhood masculinity,” was formed by subtracting the sum of scores for stereotypically feminine toys and activities and the global rating “girlish” from the sum of scores for stereotypically masculine toys and activities, preferences for male playmates and the global rating “boyish.”

This information on childhood gender role behavior was obtained using a 14-item (Items A–N) questionnaire (see Appendix B). The questionnaire was designed to assess specific aspects of childhood play that have been found to be altered by prenatal exposure to higher-than-normal levels of androgens, as in the condition congenital adrenal hyperplasia (CAH; e.g., Berenbaum & Hines, 1992; Ehrhardt & Baker, 1974; Ehrhardt, Epstein, & Money, 1968; Hines & Kaufman, 1994). Item A assessed the sex of childhood playmates, Items B through L assessed preferences for masculine (Items C, D, E, and G), feminine (Items B, J, and L), and neutral (F, H, I, and K) toys and activities, and Items M and N provided global ratings of “girlishness” and “boyishness.” Responses to each item were made on a Likert scale ranging from 1 (*almost always*) to 5 (*not at all*), with the exception of Item A, where 1 represented *always girls* and 5 represented *always boys*. For toy and activity preferences, scores for individual items were summed to provide a total score, with scores for negatively worded items reversed prior to summing. Because feminine toy and activity preferences were assessed by three items and masculine and neutral preferences were assessed by four, the score for feminine preferences was multiplied by 1.33.

Marital Status. Participants indicated whether they were currently single, separated, married, or cohabiting.

Personality. Personality traits were assessed using subscales of the 16 Personality Factor Inventory (16 PF; Cattell, Eber, & Tatsuoka, 1970) that are described as assessing *assertiveness* (Factor E) and *tender-mindedness* (Factor I). These particular measures were selected because they show large sex differences ($d > 1.0$; Feingold, 1994). Factor E is described as assessing whether a person is humble (mild, accommodating, conforming) versus assertive (independent, aggressive, stubborn) and Factor I as assessing whether a person is tough-minded (self-reliant, realistic, no-nonsense) versus tender-minded (dependent, overprotected, sensitive) (Cattell et al., 1970).

Hand Preferences. Hand preferences for skilled manual tasks were assessed using a five-item inventory

derived from Bryden (1982), on which respondents use a 5-point Likert scale ranging from 1 (*right always*) to 5 (*left always*) to indicate the hand they use for five common tasks (writing, throwing a ball, holding scissors to cut, holding a toothbrush, and drawing). Item scores were summed to provide a handedness index, with lower scores representing stronger right-hand preferences. Hand preferences were assessed because prior studies suggest that they relate to the prenatal hormone environment. Women exposed prenatally to higher-than-normal levels of androgen or estrogen have been reported to show reduced right-hand preferences (Nass et al., 1987; Smith & Hines, 2000). This is consistent with evidence that men generally show reduced right-hand preferences in comparison to women although the sex difference appears to be small (Hines & Gorski, 1985; Seddon & McManus, 1991).

RESULTS

Sex Differences

Most measures showed the sex differences, or lack thereof, predicted from prior research (Table I). As expected, men and women scored similarly on the Self-Esteem Scale and the PGWBS. Core gender identity, sex-

ual orientation, and gender role behavior were sex-typical; both men and women were largely satisfied with their sex of rearing, were largely heterosexual in fantasy and behavior, and conformed similarly to the gender role behaviors typical for their sex. Regarding childhood gender role behavior, males recalled greater preferences than did females for masculine-typical toys and activities and for males as playmates and scored higher on the global rating, "boyish" and on "childhood masculinity," whereas females recalled greater preferences than did males for female-typical toys and activities and females as playmates, and scored higher on the global rating, "girlish." Also as expected, males and females did not differ in their recall of enjoying sex neutral toys and activities in childhood. Personality traits showed the expected sex differences, with males scoring higher on Factor E and lower on Factor I than females. There was, however, no sex difference in hand preferences.

CAIS: Database Versus Support Group

Initial comparison between the women with CAIS who had been recruited through the database versus the support group revealed two significant differences. Sexual orientation during the most recent 12-month period was more strongly heterosexual, $t(11) = 2.69$, $p = .02$,

Table I. Quality of Life and Gender-Related Behavior in Female and Male Controls

	Female controls ($n = 33$)		Male controls ($n = 14$)		t	df	p
	M	SD	M	SD			
Quality of life							
Self-esteem	19.03	6.71	16.29	4.38	1.66	36.25 ^a	.11
PGWBS	74.09	18.96	75.79	19.92	0.28	45	.78
Gender-related behavior							
Core gender identity (C)	4.15	1.77	4.50	2.24	-0.57	45	.57
Core gender identity (L)	4.42	2.09	4.29	1.90	0.21	45	.83
Sexual orientation (C)	2.39 ^b	0.61	2.21	0.43	0.89	45	.38
Sexual orientation (L)	2.81 ^b	1.82	2.71	0.91	0.19	45	.85
Gender role (C)	2.09	1.47	2.07	1.33	0.43	45	.97
Gender role (L)	2.09	1.23	2.29	1.20	-0.50	45	.62
Toys/activities (M)	12.18	2.60	15.64	1.98	-4.45	45	.001
Toys/activities (F)	13.64	2.89	6.80	2.53	-7.68	45	.001
Toys/activities (N)	8.30	2.14	8.71	1.54	0.65	45	.52
Playmates (M)	2.52	0.71	4.14	0.53	8.60	32.48 ^a	.001
Girlish	3.64	0.99	1.64	0.84	-6.56	45	.001
Boyish	2.36	1.03	4.29	0.73	6.35	45	.001
Childhood "masculinity"	2.84	0.64	4.01	0.44	-6.19	45	.001
16PF: Factor E	12.48	3.61	14.79	3.36	-2.04	45	.05
16PF: Factor I	11.55	2.98	9.57	3.30	2.01	45	.05
Hand preference	8.52	6.57	7.64	6.56	0.42	45	.68

Note. PGWBS = Psychological General Well-Being Scale. C = Current (past 12 months); L = Lifetime; M = Masculine; F = Feminine; N = Neutral.

^aUnequal variance.

^b $n = 32$.

unequal variance, and recalled childhood toy and activity preferences were more masculine, $t(20) = 2.40$, $p = .03$, in participants recruited through the database compared to those recruited through the support group. These differences were in opposing directions: women from the database were more female-typical in sexual orientation but more male-typical in recalled childhood toy and activity preferences than women from the support group. Because of this and because only 2 of 18 comparisons suggested differences between the two groups, they were combined for subsequent analyses.

Women With CAIS Versus Female Controls

Comparison of the 22 women with CAIS to the 22 matched female controls revealed no significant differences on any of the quantitative measures. This was true for the measures related both to quality of life and to psychosexual development (see Table II). There were no differences in self-esteem, psychological well-being, core gender identity, sexual orientation, gender role behavior, recalled masculine, feminine or neutral toy preferences in childhood, recalled preferences for male versus female playmates, recalled "girlishness" or "boyishness" or the composite variable, "childhood masculinity." The groups

also did not differ in personality characteristics or in hand preferences.

Marital patterns were also similar in the CAIS women and the control women. Among 20 women with CAIS who provided this information, 14 (70%) were married or cohabiting, and 6 (30%) were single. Among female controls, 16 of 22 (73%) were married or cohabiting and 6 (27%) were single.

DISCUSSION

We were interested in psychological well-being and psychosexual development in women with CAIS. We examined two general hypotheses: (1) women with CAIS show reduced psychological well-being or quality of life compared to women without CAIS; (2) women with CAIS show alterations in psychological or behavioral domains in which sex differences have been observed. Neither hypothesis was supported.

Our results provide additional evidence that psychological development in CAIS is typically feminine. The CAIS women in our study reported a female-typical gender identity, heterosexual erotic interests, and female-typical gender role behavior in adulthood. They were as likely to be married or living with a male partner as female

Table II. Quality of Life and Gender-Related Behavior in Individuals With CAIS and in Matched Controls

	CAIS ($n = 22$)		Matched controls ($n = 22$)		t	df	p
	M	SD	M	SD			
Quality of life							
Self-esteem	21.14	5.87	19.41	5.80	-0.98	42	.33
PGWBS	72.05	13.35	78.36	16.85	1.38	42	.18
Gender-related behavior							
Core gender identity (C)	4.64	3.06	3.91	1.57	-0.99	42	.33
Core gender identity (L)	6.23	3.88	4.59	2.28	-1.71	33.98 ^a	.10
Sexual orientation (C)	2.41	0.80	2.43	0.68 ^b	0.09	41	.93
Sexual orientation (L)	2.59	0.91	2.62	0.80 ^b	0.11	41	.92
Gender role (C)	1.73	1.42	2.09	1.34	0.87	42	.39
Gender role (L)	1.91	1.57	2.00	1.11	0.22	42	.83
Toys/activities (M)	12.59	2.79	11.32	2.30	-1.65	42	.11
Toys/activities (F)	13.78	3.77	13.66	2.81	0.12	42	.91
Toys/activities (N)	8.77	1.97	8.77	1.82	0.00	42	1.00
Playmates (M)	2.55	0.60	2.45	0.74	-0.45	42	.66
Girlish	2.38	1.16 ^b	2.18	0.85	0.64	41	.52
Boyish	2.76	1.18 ^b	2.32	0.99	-1.34	41	.19
Childhood "masculinity"	2.98	0.66 ^b	2.68	0.60	-1.52	41	.14
16PF: Factor E	13.86	3.69	12.39	3.78	-1.13	42	.27
16PF: Factor I	10.36	2.11	11.27	2.60	1.27	42	.21
Hand preference	7.91	5.06	9.18	7.22	0.68	42	.50

Note. PGWBS = Psychological General Well-Being Scale. C = Current (past 12 months); L = Lifetime; M = Masculine; F = Feminine; N = Neutral.

^aUnequal variance.

^b $n = 21$.

controls. We also found that they were conventionally feminine in personality characteristics, that their hand preferences were no different from those of controls, and that they recalled childhood activities involving female-typical playmates, toys, and interests. Prior research also suggests that CAIS women are conventionally feminine (Masica, Money, & Ehrhardt, 1971; Wisniewski et al., 2000).

Clinical Implications and Strengths and Weaknesses of the Study

Our study differs from prior studies in four positive ways. We were able to study a larger sample of CAIS women, included a normal control group; matched for age, sex, and race; examined a wider range of sex-related variables, including measures of childhood gender role behavior, personality characteristics, marital status, and hand preferences; and included measures of general psychological health. In regard to these last measures, outcomes were reassuring. Individuals with CAIS did not differ from controls in self-esteem or general psychological well-being.

The study also had some weaknesses. One problem was the lack of medical records confirming the diagnosis of CAIS in women recruited through the support group. However, the similarity of their behavior to that of women recruited through the database, where diagnosis could be confirmed, reduces the likelihood that incorrect diagnosis accounts for the results. A second problem is selection bias. In clinical studies, the entire population of patients is rarely, if ever, available for study. Those who are available may be more or less well adjusted than the population in general. In our study, only a third of the eligible individuals from the database could be enrolled in the study and participation rates for the support group could not be determined. The reason why database patients could not be contacted for the study was not always known, but in some cases permission was denied because the individual's doctor was concerned about inadequate disclosure and poor adjustment to the diagnosis. Therefore, individuals considered by their doctors to be at risk for poor outcomes may have been selectively excluded. We attempted to counteract this possible bias by recruiting additional participants through a support group, where patients who are less satisfied with their medical care and psychological outcomes might be expected to be found. Psychological characteristics for participants recruited from the two sources were similar. Despite the expectation that different types of selection biases would operate in the two groups, this similarity reduces the likelihood that selection biases account for our results. Nevertheless, selection biases may limit the external validity of our study, and assessing psycho-

logical outcomes and quality of life in more representative samples of individuals with CAIS remains important. In addition, although our sample was larger than that in any prior study, it is possible that even larger samples would reveal differences that we could not detect. Finally, we did not assess or control for socioeconomic background and studies including analyses of this factor could produce different results.

Implications for Theories of Sexual Differentiation

Neural and behavioral sexual differentiation in other mammals is controlled prenatally and neonatally by gonadal hormones, particularly testosterone and its metabolites (Collaer & Hines, 1995; Goy & McEwen, 1980). When hormones are manipulated experimentally to contrast with chromosomal sex, the hormones prevail in terms of sex-typical neural and behavioral development. For instance, female rodents and nonhuman primates treated during early development with testosterone show male-typical patterns of brain structure and behavior across the life span. Similarly, males deprived of testosterone during these critical periods show female-typical brain structure and behavior. Findings of conventionally feminine psychological development in women with CAIS, who have an XY chromosome complement, but are unable to respond to androgen at the cellular level, suggest that hormones can also override chromosomal sex in determining human psychological sexual differentiation, at least when sex assignment and rearing accord with hormonal sex.

Several of the psychological outcomes assessed in this study have been found to be altered in other groups of individuals exposed to atypical hormone environments prenatally. For instance, females exposed to higher-than-normal levels of androgen prenatally show elevated levels of male-typical playmate, activity, and toy choices in comparison to normal controls. This has been reported both for girls with CAH and for girls whose mothers were prescribed androgenic progestins during pregnancy (reviewed in Collaer & Hines, 1995). These childhood behaviors also appear to relate to normal variability in the prenatal hormone environment, in that maternal testosterone during pregnancy relates linearly to masculine-typical behavior in daughters at the age of 3.5 years (Hines et al., 2002). Girls and women with CAH have also been reported to show more masculine-typical hand preferences, diminished heterosexual orientation, and higher-than-expected desires to change sex as adults (reviewed in Hines, 2000). Thus, our findings add to other data, suggesting that androgens act prenatally or neonatally to promote masculine-typical psychological development.

Findings that CAIS individuals do not differ from female controls in gender-related behavior and psychological characteristics also argue against the necessity of the female gonads, the ovaries, for feminine psychological development. The classical view of sexual differentiation is that hormones from the testes produce male-typical development whereas female-typical development proceeds in the absence of these hormones (Collaer & Hines, 1995). Thus, in the classical view, the ovaries do not play an active role in feminization. Recently, this view has been challenged by suggestions that the ovaries may actively feminize some characteristics in rodents (Fitch & Denenberg, 1998). Findings of conventionally feminine psychological development in women with CAIS, who lack ovaries, argues against their necessity for psychological feminization in humans, at least in regard to the characteristics studied in women with CAIS to date. However, women with CAIS are unlikely to be deficient in estrogen, because they can produce this hormone from testosterone, and evidently do so, at least peripherally, as evidenced by their spontaneous breast development. Therefore, although the full complement of ovarian hormones may not be needed for psychological feminization, evidence from women with CAIS cannot rule out some contribution of estrogen to feminine-typical development.

Another perspective suggests that women with CAIS might show less masculinization or more feminization of the brain and of behavior than might women in general

because women are typically exposed to some androgen. Imperato-McGinley et al. (1991) found impaired spatial abilities, assessed using subtests of the Wechsler Intelligence Tests, in women with CAIS compared to both male and female controls. However, the spatial tests on which impairments were seen do not show appreciable sex differences (Collaer & Hines, 1995), suggesting that the impairment could reflect a consequence of CAIS independent of the role of androgen in sexual differentiation. Also, in contrast to the report of impaired spatial ability, others and we have found no evidence that women with CAIS are less masculine or more feminine in respect to the gender-related characteristics of core gender identity or sexual orientation. Our findings extend the range of sex-related behaviors that appear unaffected in women with CAIS to include personality characteristics that show sex differences, hand preferences, and childhood toy, playmate, and activity preferences. Nevertheless, research on large groups of CAIS individuals, using an even wider range of measures, including spatial tasks that show substantial sex differences, is needed to resolve this issue completely.

Finally, our results reinforce prior findings from CAIS and other intersex disorders suggesting that androgen plays an important role in sexual differentiation of human behavior. In addition, although we found no differences between CAIS individuals and controls on broad measures of quality of life, further research is needed to determine if more specific aspects of psychological health (e.g., sexual concerns) are altered in these patients.

APPENDIX A: GENDER/SEX QUESTIONNAIRE

These questions are about sexuality, sexual behavior, and sex roles.

Note. The first eight items are answered using the scale provided for Item 1. Items 9–12 are answered using the scale provided for Item 9.

- 1. During the *past 12 months*, my behavior has been what most people in this country consider appropriate for my sex:

1	2	3	4	5	6	7
always	almost always	most of the time	about half of the time	only some of the time	almost never	never

- 2. During my *lifetime*, my behavior has been what most people in this country consider appropriate for my sex:
- 3. During the *past 12 months*, I have enjoyed being a person of my sex:
- 4. During my *lifetime*, I have enjoyed being a person of my sex:
- 5. During the *past 12 months*, I have wished I were a person of the opposite sex:
- 6. During my *lifetime*, I have wished I were a person of the opposite sex:
- 7. During the *past 12 months*, I have thought I was psychologically a person of the opposite sex:
- 8. During my *lifetime*, I have thought I was psychologically a person of the opposite sex:

The next set of questions asks about heterosexuality (sexual interest in persons of the opposite sex) and homosexuality (sexual interest in persons of the same sex).

Note. All four items are answered using the scale provided for Item 9.

9. During the *past 12 months*, my sexual behavior has been

1	2	3	4	5
exclusively heterosexual	mainly but not exclusively heterosexual	half heterosexual and half homosexual	mainly but not exclusively homosexual	exclusively homosexual

10. During the *past 12 months*, my sexual fantasies and desires have been:

11. During my *lifetime*, my sexual behavior has been:

12. During my *lifetime*, my sexual fantasies and desires have been:

APPENDIX B: ACTIVITIES QUESTIONNAIRE

These questions ask you about the kinds of activities and playmates you preferred as a child. For each question, circle the number that most closely describes what you liked in childhood.

A. My playmates were

1	2	3	4	5
always boys	usually boys	boys and girls equally	usually girls	always girls

Note. Items B through N are answered using the scale provided for Item B.

B. I liked to play with toys like dolls:

1	2	3	4	5
almost always	a lot	a little	hardly ever	not at all

C. I enjoyed sports:

D. I liked to play with toys like cars and trucks:

E. I liked to play outside:

F. I liked drawing and painting:

G. I liked rough, active play:

H. I liked reading:

I. I liked board games, like Monopoly, Snakes and Ladders, Candyland, Cluedo, etc.

J. I liked to dress up:

K. I liked to play with building toys like Lego, Mechano, blocks, etc:

L. I liked to play with cosmetics:

M. I was girlish:

N. I was boyish:

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